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OF THE

SCIENCE OF ELECTROPLATING

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IF—

If you can keep your head when all about you
  Are losing theirs and blaming it on you;
If you can trust yourself when all men doubt you,
  But make allowance for their doubting too;
If you can wait and not be tired by waiting,
  Or being lied about, don't deal in lies,
Or being hated don't give way to hating,
  And yet don't look too good, nor talk too wise;

If you can dream—and not make dreams your master,
  If you can think—and not make thoughts your aim,
If you can meet with Triumph and Disaster
  And treat those two imposters just the same;
If you can bear to hear the truth you've spoken
  Twisted by naves to make a trap for fools,
Or watch the things you gave your life to, broken,
  And stoop and build 'em up with worn-out tools;

If you can make one heap of all your winnings
  And risk it on one turn of pitch-and-toss,
And lose, and start again at your beginnings
  And never breathe a word about your loss;
If you can force your heart and nerve and sinew
  To serve your turn long after they are gone,
And so hold on when there is nothing in you
  Except the will which says to them: "Hold on!"

If you can talk with crowds and keep your virtue,
  Or walk with Kings—nor lose the common touch,
If neither foes nor loving friends can hurt you,
  If all men count with you, but none too much;
If you can fill the unforgiving minute
  With sixty seconds' worth of distance run,
Your's is the Earth and everything that's in it,
  And—which is more—you'll be a Man, my son!

—Rudyard Kipling.

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EDITORIAL

FUNDS FOR RESEARCH ON ELECTROPLATING

By this time all the members are probably aware that the Electroplaters' Society is endeavoring to raise from manufacturers a fund of $10,000 per year for research on electroplating at the Bureau of Standards. To assure this amount it is necessary to get two hundred manufacturers to each subscribe $50 per year to this fund. To interest the manufacturers it is essential that the plan should be understood and endorsed by the individual platers, upon whom their employers will largely depend for advice and information.

As this plan involves co-operation with the Bureau of Standards, it is desirable that all the platers should understand clearly the relation of the Bureau to such industrial problems as those of electroplating. Among the most important functions of the Bureau is that of determining the facts and principles which are fundamental to industrial processes. These studies can usually best be made in some central laboratory, and thus save the duplication and waste that would result if each manufacturer attempted to conduct such research. In other words, the Bureau endeavors to make those studies that cannot be conveniently or economically made by the manufacturer himself, but leaves to each manufacturer the application of the results to his own specific processes.

The Government funds available for such research are dependent upon the congressional appropriations, which as is well recognized, are now limited by the necessity for

economy. In order to increase the available funds, and thus to make more rapid progress in their respective fields, numerous organizations have furnished the money to employ "research associates" to work at the Bureau, with the advantage of the Bureau facilities and supervision. All the results obtained by such research associates are made available to the public. As the American Electroplaters' Society is the only organization that represents the entire plating industry, it is appropriate that it should serve as a medium through which additional support may be given to research on plating.

Inquiries will no doubt be received as to whether certain problems will be undertaken in the research. The exact scope and order of the investigations will depend upon the funds available, and will be decided after a conference with electroplaters and manufacturers. Experience has shown, however, that each study in electroplating throws light upon some other problem with which it seems to have no direct connection. It is safe to say therefore that every manufacturer will benefit regardless of whether the subject of most interest to him is undertaken at once or later. Obviously, the more rapidly funds are contributed, the more quickly will the whole field of electroplating be covered in these researches. In any case it is desirable that contributing firms should indicate the problems they are interested in.

The success of this plan merely means that the Bureau facilities will be more fully utilized, and greater assistance will be given to the electroplating industry. The plater should emphasize to his employer that such research will yield a direct return in improving old processes and perfecting new ones . No donor should be allowed to feel that he is giving in order to help the Bureau of Standards, or even the Electroplaters' Society. He is simply investing in research a sum so small that with it individually he could accomplish nothing; collectively it will advance not only the eleitroplating industry, but also his own interests.

The Government, through the Bureau of Standards has during the past several years, expended a considerable amount on researches on plating, with no direct expense to the manufacturers. If the manufacturers and platers

believe that such research is useful to them, and want it continued and extended, the best way to show their interest is by their willingness to contribute directly to its sopport. If manufacturers fail to support this project, it may reasonably be assumed that they do not desire the continuance of research on plating.

Respectfully

RESEARCH COMMITTEE
F. J. HANLON, Chairman
C. E. VANDERAN
R. J. O'CONNOR

SOME EXPERIENCES OF A JOB PLATER

The title of the following paper, "Some Experiences of a Job Plater," might more correctly be, "Job Shop Practice."

The recommendations made here are not intended to apply to the larger and more successful Job Shop for obvious reasons. But is intended to encourage attention to small details and system in the smaller shops.

When the art of Electroplating, as applied to industry, was young, the process was in most cases carried on in a shop aside from, and independent of the manufacturing plants; that is, of the foundries, metal fabricators, assemblers, etc.

It was generally conceded that plating was a practice that they understood little about, and as long as the work, service, price, etc., was alright, many of the manufacturers had no desire to combine the finishing and manufacturing of their goods. But after a few years the metal industry made such rapid strides, and the demand for electroplating and its allied finishes became so acute, that in the case of the larger manufacturers, it was no longer practical to send their product out to be finished, which resulted in the installation of many plating plants. But I have been informed that in the early days many of the smaller makers of metal goods who did not have enough of finishing to warrant the installation of a finishing plant were forced to do it because of inadequate service or the absence of a good job plating plant in certain localities. It has been observed by the writer that in the case of the smaller manufacturers, the above condition has been prominent in recent years also.

Some of the makers of metal goods on a smaller scale have advised me that because of poor work, high prices, etc., they were forced to install a plating plant in order to compete with the "big fellows." The manufacturer in this case is under the impression that he cannot afford to pay a firstclass plater the wages he demands, and when something goes wrong with the solution or elsewhere he depends upon the superintendent or some outside source to pull the plating room from grief. In all fairness to the superintendent or others who step in to a plating room and attempt to straighten out the trouble, it has been my experience that this is a very extravagant way to run a finishing department. To do good finishing economically and do it consistently, it is necessary in the majority of cases to have a good plater in charge of the solutions and on the job all of the time. Therefore, a wideawake plater with a well-equipped job shop in this case renders a real service.

On the other hand, there is the manufacturer whose finishing does not run into large quanities who thinks he can finish his work cheaper and better in his own plant than outside and thereby eliminate the disadvantages he thinks are associated with sending his work out; in this case it is up to the job plater in his locality to prove which is the best practice. It is very important in this event, assuming that the manufacturer is agreeable to give the job plater a chance to bid on his work that the plater go very carefully over the problems of the manufacturer in question and make sure that his plant is equipped to give service and give it economically. If the plater cannot do this it is a very good policy to admit it, for if he gets the work and makes a botch of it, he or nobody else will get a chance at it again and the manufacturer will rightfully have a bitter opinion of all job finishing plants.

The manufacturer above mentioned represents the nucleus of the work for the job finishing plant, that is, at least so in the East; other sources of work in order are the overflow of large manufacturers at certain seasons of the year, jobbers of metal goods (this applies to distributors who maintain an office in some of the larger cities, getting their work made and formed at various foundries and machine shops from where it is shipped to the job plating

plant to be finished and packed; this represents a very desirable source of work for the job plater).

There are also jobbers who buy unfinished work (in most cases from bankrupt plants), have it finished to make it salable; refinishing of work for hotels, restaurants, railroads, etc.; also refinishing work for retailers, jewelry stores and the like; household work, stove parts, lamps, etc., and the refinishing of automobile trimmings.

Bidding on the Work

The popular idea that the price of a job can be lowered after it is made more easily than it can be raised is outlawed in most cases, particularly in recent years, not only because of competition in your own immediate line, but of competition in general. What is meant here is this: a concern or a jobber who has no plating plant is bidding on a contract along with a number of other concerns in the same line who maintain a plating plant. Now, your prospective customer knows his costs pretty well up to the finishing. What the cost here is, he, as a general rule, has no idea, this concern or individual must be given the lowest possible price the first time because if your rates are too high you not only beat him but you do yourself out of the job.

In bidding on work that has to be hand-polished, it is a good idea to get a quantity to try out before setting a price having your foreman polisher or somebody that you can hold responsible do the work on the samples. If this is not possible, and it is not, of course, on odd lots of work, somebody that knows polishing costs should make the price.

The price for barrel plating can be pretty nearly determined by the condition, finish desired, size, etc., of the merchandise.

The transportation cost, furnishing of containers or shipping cases, racks or special equipment, should be strictly understood by both parties when the job is taken.

Transportation

A strict check should be made of the incoming work because a job plater has enough trouble laid at his door without getting blamed for the loss of a small lot of work that has never reached his plant or the shrinkage of a large

shipment that was short weight when received. A system should be maintained to weigh and record every shipment that comes in, also a memo with the finishing specifications following each lot of work through the plant. Although the customer has agreed to furnish containers or cases, it should be seen to that shipping containers are in good condition when the goods leave your plant. I have seen a shipment of nicely finished work sent out in barrels in such bad shape that the goods either fell out in the truck or were scattered in the receiving room of the place they were consigned to, which caused the manager to say, "I wish we could see our way clear to do our finishing on our own plant." Now, this is one of the many small details that should be provided for. If the cases or barrels are in a bad shape when received, they should be either repaired or substituted by new ones. Before replacing the finished work it is a good plan to make this part of one of the men's work. A little co-operation of this sort has been found to pay and I have yet to see anyone intentionally impose upon it. Also see that the finished goods are well covered when shipped in wet weather.

Plating Specifications

Too many people are under the impression that when iron or steel is nickel plated that it is rust proof. From the individual with a pair of rusty head-light rims to the concern with a ton of work, they should be given to understand just what to expect. I have in mind a concern who had a very good auto accessory that was in demand. This accessory had a rim attachment to be polished and nickel plated, that when in use was exposed to the elements, which they intended to make out of steel. In fact, they had already received the raw material and had begun operations on it. They were given a price for the finishing of this item, but when told that it could not be guaranteed from corrosion for the use it was intended, they were incredulous and took up the question with a manufacturing concern in town, who, although they did a great deal of plating on steel parts, their product was used inside; never at any time being exposed to the outside elements. Therefore, when the manager or purchasing agent told the maker of automobile accessories that their concern never had any

trouble with rust, it was perfectly honest and well-meant statement. When the goods were finished they certainly looked nice, but after the jobbers and garages started to receive complaints about rust; "then the fun began." After a non-corrosive metal was secured and the trouble was overcome it was conceded that the experience with steel was very costly.

A large quantity of steel parts was nickel plated by the barrel process for a concern some time ago. Nothing was said about the use for which they were intended, and as the finish looked very good, the customer was well pleased. After about six months, however, he came back very much dissatisfied. The parts were put to use on a devise that was used on ocean liners and were returned in a rusty condition.

"Just think of it!" he said, "the nuts were rusted so badly we could not get them off the bolts." The above cases are only characteristic of many that have come to grief where a thorough understanding of what to expect of a finish was absent.

Handling of the Work

First of all, the job shop from an equipment standpoint, must be in a position to handle such work that is coming in steadily as expediently as possible making sure that his wheels in the case of polishing, and his barrels in the case of tumbling, are in a condition to efficiently do the work. I mention this for in the handling of various lines of work it is very easy to go ahead with a new job without removing the sometimes injurious traces of the previous work. The solutions, type of barrels, type of racks must be right. To give an illustration of what is meant here: a few hundred pounds of small screws were received which were reasonably free from grease. The work was tumbled about twenty minutes in a wet barrel, using potash and cyanide, then transferred to the plating barrel and plated an hour; afterwards tumbled in soap water, dried out in sawdust with very good results. Now, some rods about ten inches long, in a very greasy condition, were received and were put through the same operation with the result that the rods came out peeled. Not only was the cleaning at fault here, but a plating barrel running at a current density to

efficiently plate small articles will not efficiently plate large pieces. Now, if the rods were first put through boiling potash, rinsed, put through hot soap water, colored in sawdust or in balls, depending on the desired finish, and plated in the same barrel with half the current but the same length of time, the results would be satisfactory.

Now, assuming that the rods were properly cleaned, they could be plated in the same barrel mentioned for one-half an hour and would not peel (if left in an hour they would blister and peel anyway), but I question the wearing quality and resistance to corrosion that the half-hour plate obtained this way offers.

Still a better way of plating various kinds of work in a barrel is to have suitable barrels for different types of work. For instance, the small work could be plated very well in a celluloid roll with all the perforations possible, as this type of work needs more current and will roll evenly without any fear of cracking the panels. While the larger type of work can be plated in a heavier wooden barrel without so many perforations. This, of course, does not draw as much current, consequently will not peel or burn at the ends and the life of the barrel will be longer. If the above can be carried out it has proved to be a better practice than altering either the solution or the current, as it has a tendency to lessen the dependence on the human element.

Another phase in the handling of the work is to find out if possible for what use the work is intended. In some cases the appearance and shape of the work suggests its use, but in many instances it does not. For example, we took a contract to nickel plate certain parts of a nationally known toy. As most of the parts were small the work was mostly of a barrel nature. To insure a good luster we were taking great pains with the rolling of the items. A visit to the manufacturing plant and an examination of the finished product revealed that some of the parts were partly concealed and the background was such that a semi-bright finish was really more desirable. This same illustration would, of course, apply to work of a hand-polished nature.

Some merchandise of chain nature was sent in to be brass plated. This work was about ten inches long and

could be very nicely handled in a barrel, but for one reason—there was a piece of sheet metal about two inches square on either end, which, when rolled in the usual way, resulted in a tangled mass. Now, the specifications for this finish were not very rigid, but all work must go out at least of uniform color and have a good adherent plate, and in plants where the work is coming through every day, the condition mentioned would not be very serious as standard equipment would be available. But in job plating, although the work comes through in fairly good quantity, it comes at intervals of two or three months. The first lot was assembled and had to be plated that way, of course. It was put on hooks, one-half dozen on each hook, run through a hot potash, pickled, copper plated and brass plated, after which it was bright dipped, rinsed well and dried. This was explained to the customer and pointed out that if the work was plated before assembling it could be finished by the regular process, thereby saving a lot of handling and obtaining, if anything, a better finish. The customer willingly gave his co-operation, took a little more pains in assembling the finished work; the only inconvenience being in the use of solid brass rivets, which, ease in plating and good finish obtained, more than compensated.

A job plater must bear in mind that the handling of small lots intended for samples is very important. Oft-times a very important contract hinges on this, as well as on the first shipment of goods. Great care should be used in the finishing of new and unfamiliar lines of work as the alibi "we had to experiment with the first batch of work" has its limitations when some work that great care and pains were used in producing was spoiled in the finishing.

The above methods of handling apply to the manufacturer, distributor, jobber, hotels, etc., in which cases, as a general rule, the orders are repeated. This type of work builds the foundation for the successful job shop. Odd lots of automobile trimmings, household goods, stove parts and the like, can be sandwiched in to good advantage. Care should be taken not to slight this kind of work, for people having this kind of work are willing to, and naturally should, pay more for their work. The general tendency, I have observed, is to take great pains with the polishing

and slide it through the plate any old may as long as it looks good. The people having this work done as a rule are not very good judges of plating, and as long as it looks good they go out satisfied. But after the base metal peeps out at them in a few weeks they are disappointed and the next season take their work elsewhere or make some other disposition of the work that should go to the job plating plant. As these items are much the same shape, it is a paying proposition to have suitable racks, rheostats, etc., that will assist in giving the work a good, substantial plate.

STRIPPING NICKEL DEPOSIT FROM STEEL

In the manufacture of silver plated table cutlery the plater frequently reaches the conclusion that he can produce a better silver deposit with fewer rejects for poor plating if the knives are first coated with a light deposit of nickel, but there is one objection to this method and that is, the difficulty encountered in stripping the nickel deposit from the knives that are defective; should there be any that are defective in the plate, it is desirable to strip the plate from the knives without injury to the surface of the knives so that the knives may be replated without any labor cost for refinishing the base. It is, therefore, apparent that the ideal stripping solution or condition is one that will remove both the silver and nickel deposit without injurious effect on the base, and in a reasonably short period of time. It is the practice of most platers to strip their defectively plated knives (I assume they all have some to strip) in a cyanide solution with the knives as anode, and that all are more or less successful.

If knives are plated only with silver, there is little or no problem connected with stripping, but not so when they are nickel plated before silver plating. The results in trying to strip silver and nickel are anything but uniform; at times the stripping seems to be accomplished quickly and without any trouble; at other times the nickel will strip very slowly, and the steel base become corroded, so that the knives must be refinished, then again it seems almost impossible to get the nickel stripped off. It will take hours to strip the silver and as many days to strip off the nickel. Why this is so has been somewhat of a puzzle.

We have attempted a little experimting to try and determine the factors that help or hinder the stripping of nickel deposit from steel knives. The work done has been very limited and confined to the cyanide solution, because it is desired to strip the silver and nickel in the same solution, and to take the silver stripped from the knives out of the solution in a solid metallic state so that this silver may be used as anode in regular plating vat. The work has been hurriedly and imperfectly done, and without the necessary equipment for accurate work, yet it is hoped that the ideas herein suggested may stimulate further work along this line that may lead to a happy solution of this problem.

Experiments carried out would indicate that the most important factor in stripping nickel deposits from steel knives is the current density employed. While there seems to be some difference due to the composition of the solution, but not enough to make this a serious factor, we would suggest for the best all-around results, especially if the strip vat cathode is afterwards to be used as anodes for plating vats, that a regular silver plating solution be used for stripping knives.

It is generally assumed that the stripping operation will be speeded up in proportion to the increase in current density employed, and this is correct in stripping most metals, but this does not seem to be the case when we attempt to strip nickel in a cyanide solution, but it does seem that the lower the current density the faster the nickel will strip.

In a solution as suggested above, when a current density of 2 is used a light nickel will strip off clean in about 45 minutes, when the current desnity is ½ this same nickel deposit will strip off in about 35 minutes, it would be safe to say that nickel will strip reasonably fast at a current density of from ½ to 2. If a current density of 6 to 12 is employed, the same deposit of nickel will not seem to strip at all (it may take a few days to strip the nickel).

If a current density of 20 is employed, this same nickel deposit will strip some faster than the above lot, but there is a tendency to corrode the base.

As stated above, it seems that at a current density of from ½ to 2 will strip the nickel deposit to the best ad-

vantage, therefore the problem is very simple: just estimate the surface of the knives to be stripped, put up the currnt accordingly, and take the knives out in a few hours all stripped and ready for replating; yes, it seems very simple, but it don't work out that way, because it is almost impossible to measure the current density employed, since the nickel surface to be stripped reduces in area all during the stripping operation. For instance, if we start with a current of 1 amp. per square foot of surface to be stripped, when the work is half stripped, the current density on the nickel surface to be stripped will be 2, and when the work is ¾th stripped the c. d. will be 4, and when the work is ⅞th stripped, the c. d. is 8, and when 15-16th, the c. d. will be 16, or when it is all stripped but 1-32, the current density will be 32. Just as long as there is nickel surface to be stripped, the steel surface remains passive and nearly all the current flows from the nickel surface. This indicates how difficult it is to know what C. D. is being used, and to keep the current down where it will strip off the nickel deposit in the most efficient way. To overcome the tendency of the C. D. to increase as the nickel area to be stripped is reduced, it is well to put in fresh work to be stripped so that the surface of nickel or silver to be stripped will always be large enough to prevent the C. D. being higher than 2. To illustrate, if we put in a vat, knives enough to furnish an area of 10 square feet and the ammeter is at 10, when the knives are half stripped, the current could be cut to 5 amp., but it is difficult to keep cutting the current as the surface becomes smaller; it is better therefore to increase the surface to be stripped by putting more work in the vat to be stripped; if this is done it will prevent the current getting too high on the small surface of nickel on a knife that is almost stripped. It is the practice of some platers to use the strip vats as a means of electrolitic refining scrap silver anodes. In this way a large amount of surface is furnished by scrap silver anodes; this will keep the current low enough for stripping the nickel and also help keep silver in solution and the deposit on the cathode good.

If three lots of work are put in a cyanide strip solution, each lot having the same area of surface, the total area of

lot 6 sq. feet, one lot is silver, one nickel and the other steel and the total current is 6 amp., or a C. D. of 1, the silver surface will furnish or allow to pass from it about 60% of this current, the nickel surface about 40% and the steel surface not any. If we change the total current to 24 amp., about 100% of the current will come through the silver surface, the nickel surface will coat over with a film and become passive and the C. D. on the silver surface will be 12. The nickel will strip very slowly, if at all, under these conditions. If the current is put up to 24, which is more than the silver surface will take with ease, the nickel surface is forced to take some of this current, say,, about 25%. This condition will strip the nickel slowly and may cause corrosion of the steel base.

When the nickel surface is once coated with an insulating film because of excess current, this film seems to be permanent, even if the current is afterwards reduced to where the nickel should strip.

To my mind the ideal condition for stripping both silver and nickel from steel knives, is to keep the current low enough so that the nickel and silver will strip simultaneously. If, when the silver is half stripped no nickel has been stripped from the base, the current is too high.

The suggestion we have to make may be summued up as follows: Keep the current on the nickel surface to be strippd at less than 2 amp. per square foot; to be sure that the current is as low as this on knives that are almost stripped keep plenty of fresh knives scrap silver, or racks to be stripped in the vat.

EDWARD N. TODD

At his home in Short Hills Edward Neville Todd died recently after an illness of two or three months. He was 68 years old, and until recently was president of the Hanson & Van Winkle Company.

BRANCH NEWS

Pittsburgh Branch

Meeting opened with the best attendance Pittsburgh Branch has enjoyed for several months and Mr. Robert M. Garland, Garland Mfg. Co., West Pittsburgh, Lawrence Co., was duly elected to associate membership. Several questions of general interest were brought up and many good points were brought out. On Monday afternoon, March 1st at 1:30 we are to meet in a body at the office of the Westinghouse Electric & Mfg. Co., East iPttsburg, and as the guests of Mr. John Corbit, will be taken for a trip through the plant, and an opportunity of inspection of their new electroplating department, where every known labor saving device has been installed, all members are looking forward to this trip. The members present are looking forward to the annual convention at Newark and are going to try and have a paper ready that will be of general interest to the whole society, and we hope that will cause some discussion.

Philadelphia Branch

The regular monthly meeting of Philadelphia Branch was held in the U. of P., February 5th, 1926. The meeting being called to order by the President George Gehling.

A communication was read from the Newark Convention committee calling attention to the coming event and requesting the hearty co-operation of each member of the A. E. S., to make the convention a big success.

A committee of Philadalphia Branch visited the chemistry class of Newark Branch in January, and reported in glowing terms the interest shown by the class and the hospitality and courtesy extended to the committee during their visit.

Mr. Graham is still in the hospital, but is improving nicely. It will be some time before he will be able to attend the meetings.

Toronto Branch

We held a brief business session on Monday evening, January 25; elected three members and postponed action on other matters. Then the ladies came; some brought cakes—lovely, luscious cakes—all covered with icing n'everything. Colin Turner greeted them in a truly charming manner and progressive euchre was the feature of the balance of the evening. Harry Cresswell and Alex Armstrong both expected to win the smoker's stand, beautifully finished in copper, but Mr. Everett walked away with it. Earnest Coles took a cute cigarette case in hammered copper, and the ladies won the other six prizes—Mrs. Carter, silver bon-bon dish; Mrs. C. G. Colwill, silver cake dish; Mrs. Henry Wallace, a dandy cribbage board; Mrs. John Magill, silver cake fork; Mrs. Everett, nickeled towel bar; Mrs. John Acheson, silver berry spoon. Now, who got the booby prizes?. Coffee, sandwiches and cake were served—everybody became acquainted with somebody. Mrs. Thomas

O'Keefe made a wonderfully charming dispenser of the refreshments. Everyone present appeared to enjoy the evening. The ladies were requested to aid in getting the menfolks to attend meetings. This little social event having proven a success, we expect Toronto Branch will pull off a near banquet next time. A picnic during the coming summer needs a promoter right now. Our next meeting will be held February 22.

New York Branch

The January meetings of the New York Branch, A. E. S., were well attended and conducted.

The welfare sessions of both meetings were exceedingly interesting, Mr. Adolph Stremel, Mr. Franklyn McStocker and Mr. Thomas Haddow partaking in a lively discussion on Properties of Cromium and its Color in comparison to white gold for use in the jewelry plating trade. These gentlemen are all members of N. Y. Branch. Discussion on benefits of cadmium plating for rust-proofing purposes by Messrs. George Wilson and Mr. Elias Shorr of N. Y. Branch, A. E. S.

Discussion on best ways of pickeling nickel silver of 18 per cent quality by Mr. William Loeb, Mr. William Voss, Mr. J. Downes. Formula decided on as best for pickling same by Mr. Loeb:

Sodium bicromate, 80 lbs.

Sulphuric acid, 75 lbs.

Water, 300 gallons.

Dissolve bicromate of sodium in water and add acid gradually. Same formula can be used for matt effect (same as matt dip).

The second meeting was addressed by Mr. William Voss, his subject being "Electric Equipment," giving detailed explanations on differences of shunt wound and compound, wound generators in use in the plating industry, and went into minute details of care and workings of both types of machines and asked members present to question him on points not quite clear to them and he would gladly answer them to the best of his ability, which he did in a most satisfactory way, receiving a rising vote of thanks from members present of the N. Y. Branch. Discussion followed this address by Mr. Stremel, Mr. Voss and Mr. Flanagan on causes of iron wire used in silver solutions on annodes to break up or corode, finally decided and advised to use steel wire in place of iron, and also same may be remedied by addition of cyanide into bath. Not enough of free cyanie given as cause of corrosion of wire. Discussion followed this on best ways and means of plating dye castings, Mr. H. Ruhlman, Mr. Stremel and Mr. Voss giving their experiences and ways of handling same.

Mr. Dupernell of N. Y. Branch read and spoke of the activities of the New British Society of Electroplaters, the Faraday Society, and it was R. M. S. to have our librarian, Philipp Morningstar, N. Y. Branch, A. E. S., seek co-operation and membership in this society.

Hartford-Connecticut Valley Branch

The January meeting of Hartford-Connecticut Valley Branch was held at the Springfield Chamber of Commerce on Monday, January 25. Mr. Bradford H. Divine spoke in a very entertaining way on the relation of polishing to plating. Among other things he described several recent developments in machine polishing and stated that this subject is being given much attention at present on account of the demand for large production and lower costs. Mr. Divine also emphasized the importance of glue in polishing, which, in his opinion, is the most important element to be considered.

Detroit Branch

Report of the February 5th meeting Detroit Branch: Owing to a number of local firms combining, some of the boys are at liberty, their work has ben honored with first prizes at the different World Fairs, in different parts of the World. Anyone knowing of positions vacant, please communicate with me and I will notify them at once.

Most of our members were visiably affected by the sudden death of our Vice-president, Charles Metzger and the meeting was adjourned for a suitable period, while members stood with bowed heads in reverence. His death occurred January 19, 1926 due to gall-stones. The need of a "Code of Ethics" was commented on favorably by everyone present. It is hoped that suitable action be taken up on this subject at the annual convention.

Our old friend, Walter Allen is with us again and helped entertain the crowd in his usual manner; a rising vote of thanks was given him. (If it will do him any good.)

One of our out of town members exhibited some beautiful specimens of bright nickeled and Chromium plated work. The methods used for the nickel was ancient history and he could not report on the Chromium as it is taking the combined efforts of a Practical Plater, Electro-Chemist, Metallurgist and a Chemical Engineer to handle a five gallon bath.

Our new members are making a good impression by attending the meetings regularly.

It was with reluctance that the meeting broke up at a late hour.

Bridgeport Branch

The February meeting was held on the 5th. Owing to weather conditions attendance was very poor.

Letters from Newark Branch regarding the convention were read; also a letter from the N. Y. Branch telling of their banquet and Founders' Day program.

Four applications were elected to membership.

Because of the small attendance the secretary was instructed to send out cards to the effect that a special meeting will be held on February 12, as there are some important matters regarding the releasing of the rooms and the banquet program.

Rochester Branch

The fourteenth annual banquet was held at Powers Hotel, February 13. It was the most successful ever held. The attendance, which was about forty couples, of which all seemed to bring their good nature with them. Everyone seemed to have a wonderful time. The entertainment was of the best and seemed to be approved by all. We had a fine gathering of members from other cities which was very pleasing. Greetings, which were telegraphed, were from our Supreme President, Mr. Musick, light at the height of our evening. It was most gratifying; also greetings from our brother member at Havana Cuba, Jose Diana—it was enjoyed. In our drive for new members, Mr. Groh, Mr. Gartland and Mr. Lopez visited Syracuse and rounded up a group of platers. I believe we will get a large membership from there before April 1. Before long we are going to do the same in Buffalo. Rochester Branch wishes all branches success in their membership drive.

Cleveland Branch

The Cleveland Branch of the A. E. S. met at the Hotel Winton for the regular February business meeting. The meeting was called to order at 8 P. M., with President Scott presiding. All officers were present. The attendance was large. The minutes of the previous meeting was read and approved as read. Letter from Royal Clark read and secretary instructed to answer it . Letter from Diebold Safe and Lock Company read and secretary instructed to send application blanks requested. Letter from N. Y. Branch read and placed on file. Letter from Convention Commiee read and ordered reread at next meeting. Secretary instructed to send a telegram of congratluation to E. W. Hale on his fiftieth anniversary. It was decided to have our May meeting at Mr. Heargist home to analyze solutions. All business being taken care of the evening was spent in a general discussion on pickeling steel. Adjournment was called for at 10 P. M.

"DADDY" HALE WEDDED HALF CENTURY

Akron Couple Numbers Nathan Hale and Theodore Roosevelt Among Relatives—Husband, at 72, Tinkers With Radio and Enjoys Life

Mr. and Mrs. Edward W. Hale, 83 Morningside Drive, will quietly celebrate their golden wedding anniversary at home Sunday. Mrs. Hale is confined to her bed and the demonstratoin will have to be limited on that account.

Mr. Hale is 72 years of age, but no one will believe it. He didn't get to bed until 2 o'clock Saturday morning, having been up tinkering with his radio set. He smokes cigarets, too.

A. E. S. sends congratulations to both "Dady" and Mother Hale.

Chicago Branch

Regular monthly meeting Chicago Branch held February 13, 1926.

Meeting called to order with President F. L. Greenwald presiding, and a very good attendance.

President Greenwald called upon Mr. E. Lamoureux, Chairman Banquet Committee, for a report on banquet held January 23, 1926. This banquet was a very successful one; also one of the largest, considering attendance.

There was a drawing held for the ladies, and some fine prizes were awarded the lucky ones:

Mr. R. J. Hazucha donated a beautiful table lamp.

Mr. F. L. Greenwald donated table mats.

Mr. E. Howard donated vanity bag.

Mr. E. V. Allen donated waffle iron.

Mr. S. E. Huenerfauth donated pillow slips.

Mr. J. C. Kretschmer donated curling iron.

Mr. N. P. Hunted donated perfume atomizer.

Mr. E. Lamoureux donated $5.00 in cash.

Mr. H. A. Gilbertson donated lady's dinner ring.

Mr. O. E. Cervic, Chairman of the Educational Session held in the afternoon of banquet, reported that there was an attendance of about 180 present. Papers were presented by Mr. C. W. Humphiers, subject, "Chromium and Cadmium Plating." Mr. George Hogaboom, "Brass Plating." Mr. Erwin Sohn, "Corrosion." F. Taylor, "The Use of Ammeter in Plating Room."

Chairman also stated that a stenographer was on hand and notes of the papers and discussions will be forwarded to the Editor for the REVIEW.

Under the head of Good and Welfare, Mr. F. J. Hanlon, Chairman Research Committee, spoke a few words on the work and hom same is being carried on. Following this talk the members voted to have Chicago Branch contribute $150 toward this fund to help carry on this work now being done ta the Bureau of Standards, Washington, D. C.

QUESTION BOX—CHICAGO BRANCH

Q. 1. What is a good cleaner for brass reflectors and treatment before nickel plating?

A. 1. Cleaner made up of Trisodium Phosphate Soda Ash and a small amount of caustic soda was recommended.

Q. 2. Can a Bronze solution be run bright the same as a bright brass, if so, what can be used as a brightener?

A. 2. Carbonate of nickel was suggested.

Q. 3. Will German silver 18% silver stand up as well as German silver when nickel plated?

A. 3. No. One member states that unless same is heavily nickel plated it will tarnish very readily.

Q. 4. Will a double nickel solution turn to a single by working?

A. 4. No.

Q. 5. What is an English finish—how is it produced?

A. 5. Finish is obtained by using dip made up of Copper, Sulphate and Antimony Sulphurette.

Q. 6. Hoy can I get a black on yellow brass without using Carbonate of Copper and Ammonia?

A. 6. Caustic Soda White Arsenic with the use of current will produce a semi-black on yellow brass.

Q. 7. Why is Barium Chloride used in Single Nickel solution?

A. 7. To form Nickel Chloride same should be dissolved in a separate tank or crock and left to settle for 24 hours before adding to solution.

Q. 8. How can I turn a Single Nickel solution to a double solution?

A. 8. Add Sulphate of Ammonia.

Q. 9. Could a headlight reflector be produced by electroplating as cheap as a reflector made out of brass metal, including all operations that a brass reflector reuires?

A. 9. On this question a paper was read relating to several patent methods of producing reflectors by electro deposition, but the consensus of opinion was that reflectors made this way would be too costly for general use.

Milwaukee Branch

The Milwaukee Branch, A. E. S., held its regular business meeting February 11, 1926, President R. M. Goodsell presiding. The attendance was very good.

Three new members were initiated and three applications for membership presented. Our branch will, no doubt, get its quota during the membership drive, and possibly go over it.

The educational meetings of the past few months have been well attended, even though we have plenty of members who do not take advantage of these features. To those of our members who have not attended these meetings we will say that have missed something that later on may be of use to them. We have been discussing "Cleaners" and "Cleaning." Mr. Nishwitz promised to give us a talk on the cleaning and plating of die castings at our next educational meeting. Mr. Nishwitz has been unusually successful at this line of work, so his talk should be valuable and none of the members can afford to miss this. Those who cannot attend this meeting should come to the next, as our Librarian, Mr. Marx, will have a feature of this kind at **each meeting**, or something equally interesting.

New York Branch Holds Successful Banquet

A record crowd attended the seventeenth annual banquet of the New York Branch on Saturday, February 20, four hundred and forty-six being present.

F. J. MacStocker, who was chairman of the committee, certainly did a good job. The afternoon educational session was very interesting and instructive. Papers were read and talks given by Messrs. Proctor, Backus, Blum, Skowronski and Hogaboom and Editor Mesle.

ELECTED TO MEMBERSHIP

Toronto Branch

J. M. Wilson, Active .....221 Elizabeth St., La Salle, N. Y.
Daniel Stiff, Active .....39 Hawshaw Ave., West Toronto, Ontario.
David Rowe, Active .....Orillia, Ontario

Pittsburgh Branch

Robert M. Garland .....Garland Mfg. Co., West Pittsburgh, Pa.

Chicago Branch

Arthur E. Booker, Active .....2651 Orchard St., Chicago, Ill.
David F. Greenblatt, Active .....3000 Sunnyside Ave., Chicago, Ill.
Jack Duncan, Active .....1915 Wolfram St., Chicago, Ill.
Thomas Kenndy, Active .....1633 No. Austin Ave., Chicago, Ill.
Elmore M. Relitz, Active .....4056 No. Troy St., Chicago, Ill.
Emil E. Dretske, Active .....206 So. West St., Waukegan, Ill.

Philadelphia Branch

Thomas Ward, Active .....529 Birch St., Camden, N. J.
Wm. A. Lambert, Active .....261 Grand Ave., Johnson City, New York
Lawrence MacLaren, Active .....Marshallton P. O., Delaware

Bridgeport Branch

D. F. Falsey, Active .....117 Fairmont Ave., New Haven, Conn.
Jos. F. Murray, Active .....13 Wollsey St., New Haven, Conn.
Fred L. Flood, Active .....111 Clay St., New Haven, Conn.
Thomas H. Chamberlain, Associate..129 Lawrence St., New Haven, Conn.

St. Louis Branch

Ralph A. Crowe, Active .....913 Vermont Ave., Hannibal, Mo.
Herman Schachner, Active .....1919 Withnell Ave., St. Louis, Mo.

Rochester Branch

Wm. D. Hart, Active .....449 10th St., Niagara Falls, N. Y.
Warren A. Guy, Active .....R. F. D. No. 2, Baldwinsville, N. Y.
Russel O. Warner, Active .....112 E. Senna St., Syracuse, N. Y.
John Balcer, Active .. ....849 Michigan St. N. E., Grand Rapids, Mich.

APPLICATIONS FOR MEMBERSHIP

Milwaukee Branch

Eugene F. Dingley .....5305 Lucksley Ave., Oakland, Calif.

Newark Branch

Joseph A. Comforte .....Thomas St., Newark, N. J.
Albert H. Schnering .....749 South St., Newark, N. J.

Toronto Branch

John Lockridge .....Wingham, Ont.

St. Louis Branch

Floyd Thompson .....Box 123 So. Pittsburg, Tenn.
Charles H. Stoddard, Associate .....2010 Arthur Ave., Chicago, Ill.
Emil C. Fritschi, Active .....852 Buffum St., Milwaukee, Wis.

Chicago Branch

Joe Signa, Active .....526 Grant Place, Chicago, Ill.
Chester McDowell, Active..c|o Chicago Thlephone Supply Co., Chicago, Ill.
Hilyard Howsam, Active .....2250 Eastwood Ave., Chicago, Ill.
R. Wilson Kelley, Active .....3319 Chicago Ave., Chicago, Ill.

CHANGE OF ADDRESSES

Detroit Branch

L. P. Brockway .....1103 Morrel St., Detroit, Mich.
Carl Everly .....1215 Howard St., Windsor, Ont., Canada
George Griffiths .....1125 Calvin St. S. E., Grand Rapids, Mich.
Allen E. Shepherd .....618 E. 9th St., Flint, Mich.

DIED

Charles Metzger, Vice-President, on January 19, 1926

Rochester Branch

Mr. Onions of Buffalo, November 19, 1925.

SUSPENDED

Newark Branch

George H. Sharky .....18 Baldwin St., Newark, N. J.

BOSTON

Regular meetings are held first Friday of each month, at 8 p. m., at the Boston Platers' Supply Co., 202 Friend St., Boston. Secretary, A. W. Garrett, 89 Alexander St., Dorchester, Mass.

BRIDGEPORT

Meets first and third Friday of each month at 62 Cannon St., Room 17, Bridgeport, Conn. Secretary R. J. O'Connor, 1228 Noble Ave., Bridgeport, Conn.

CHICAGO

Meets second Saturday of each month, at 8 p. m., Atlantic Hotel, 316 S. Clark St. Secretary, Robt. Meyers, 2210 Wilson Ave., Chicago, Ill.

CINCINNATI

Meets every Thursday, 7:30 p. m., at Vocational Training School, Spring and Liberty St. Secretary, W. J. Husing, 729 McMakin Ave., Cincinnati, Ohio.

CLEVELAND

Meets first Saturday of each month at Hotel Winton. Secretary, H. S. Kneeland, 3924 Clybourne Ave., Cleveland, Ohio.

HARTFORD-CONN. VALLEY

Meets in Springfield on alternate months. The Hartford meetings are held at the Hartford Engineers' Club, 12 Haynes St., and the Springfield meetings are held at the Springfield Chamber of Commerce, Broadway and Worthington St., Springfield. Tennant Elwin, Secretary, 117 Hobart St., Meriden, Conn.

DAYTON

Meets first Saturday of each month at the Y. M. C. A., Dayton, Ohio. Secretary, Albert Bates, Box 34, Vandalia, Ohio.

DETROIT

Meets the first and third Friday of each month at the Detroit Testing Laboratory, 554 Bagley Ave., Detroit. Secretary, Geo. Kutxen, 1087 W. State Fair Ave., Detroit, Mich.

GRAND RAPIDS

Meets on the second Wednesday of each month at the Vocational High School, 129 Bostwick Ave., N. E. Secretary, John Raven, 1139 Emerald Ave., Grand Rapids, Mich.

INDIANAPOLIS

Meets the second Saturday of each month at Hotel Denison. Secretary, Louis Mertz, 1725 Union St., Indianapolis, Ind.

MILWAUKEE

Meets second and fourth Thursdays of each month at Lipps Hall, 321 3d St. Secretary, Roy Hunt, 1314 Atkinson Ave., Milwaukee, Wis.

MONTREAL

Meets every Friday at 84 Craig St. West. Secretary, John H. Feelay, 411 Aylmer St., Quebec, Canada.

NEWARK

Meets first and third Fridays of each month at Hotel St. Francis, 22-24 E. Park St., Newark, N. J., at 8 p. m. Secretary, F. W. Matts, 55 Concord Ave., Hilton, N. J.

NEW YORK

Meets every second and fourth Fridays of each month in the World Building, Park Row, New York City, N. Y. Secretary, J. E. Sterling, 468 Grand Ave., Long Island City, N. Y.

PHILADELPHIA

Meets first Friday of each month in the Harrison Laboratory Building, University of Pennsylvania, 34th and Spruce Sts. Secretary, P. Uhl, 2432 North 29th St., Philadelphia, Pa.

PITTSBURGH

Meets first Saturday of each month at 8 p. m., at United States Bureau of Mines Bldg., Forbes St. Secretary, S. E. Hedden, 227 Fifth St., Aspinwall, Pa.

PROVIDENCE-ATTLEBORO

Meets first and third Thursday of each month at 184 Washington St., Room 308, Providence, R. I. Secretary, Robert Crook, 185 County St., Attleboro, Mass.

READING

Meets on the second Tuesday of each month. Secretary, William M. Fisher, 654 Gordon St., Reading Pa.

ROCHESTER

Meets every second and fourth Saturday of each month at the Powers Hotel. C. A. Reama, Secretary, 512 Lyell Ave., Rochester, N. Y.

ST. LOUIS

Meets first Tuesday of each month at Barr Branch Library, corner Jefferson and Lafayete Sts. Secretary, F. P. Menniges, 3205 A Arsenal St., St. Louis.

TOLEDA

Meets first Thursday of each month at Toledo University Science Building, Electro-Platers' Room, corner Cherry and Page Sts. Secretary, W. W. Weiker, 411 3d St., Toledo, Ohio.

TORONTO

Meets fourth Monday of each month at Canadian Foresters' Hall, 22 College St., Room No. 2. Walter L. Barrows, 628 Dover Court Road, Toronto, Ontario, Canada.

WATERBURY

Meets every second and fourth Friday of each month. Secretary, Wm. F. Guilfoile, 14 Oakland Ave., Waterbury, Conn.